

### **Abstract**

An object is to provide an apparatus which performs freezing and heating with a high efficiency. A compressor generates an air refrigerant with a high temperature and a high pressure by compressing the air refrigerant. As the air refrigerant is heated by a first heat exchanger and further heated by a heater, the temperature of the air refrigerant is increased to more than 200°C in which bread and cookies can be baked, and the air refrigerant is supplied to an oven. Heat of the air refrigerant outputted from the oven is recovered by a second heat exchanger, and supplied to a high-temperature side of the first heat exchanger. The air outputted from the second heat exchanger is cooled by a cooler and a third heat exchanger, is adiabatically expanded by an expansion turbine to be cooled to -85°C, and is supplied to a freezer. The air of the freezer is recovered to be supplied to the low-temperature side of the third heat exchanger, and then is supplied to the compressor.